

International Council for the
Exploration of the Sea

C.M.1977/B:39
Gear and Behaviour Committee

Experiments with net of hexagonal meshes in purse seine

by

Arvid K. Beltestad

Institute of Fishery Technology Research
Box 1964, N-5011 Nordnes, Norway

Today the nets in purse seines are usually made of nylon with or without knots, and the meshes are always of the usual rombic shape. It is also possible to make knotless nets of other mesh shapes than rombic, e.g. hexagonal. ANDREEV & LJUBIMOV (1975) have made a theoretical study of nets with hexagonal meshes. The most interesting aspects are the saving in net material in relation to net of rombic meshes. This saving is 15.5% for a net of regular hexagonal meshes compared with a net of rombic meshes with the same mesh opening with square shape. Besides this saving in net material the net of hexagonal meshes have other properties, e.g. different stretchability in the two main directions.

In view of these properties the Institute of Fishery Technology Research decided to start a project to examine if net of hexagonal meshes could be suitable in purse seines.

The easiest way to manufacture net of hexagonal meshes is to make multiple interlaces in knotless net webbing at the joining points until these form bars of the same length as the other bars in the meshes. But in this way two of the six

bars in a mesh will be of double thickness.

Last year comparative netting strength measurements between net of hexagonal and rhombic meshes of the same dimension were carried out. It was found that the netting strength was higher in net of rhombic meshes than for hexagonal meshes both in the length and breadth direction of the netting, i.e. 14 and 21%, respectively, but the net of hexagonal meshes was 16% stronger in the diagonal direction.

Initial trials of using net of hexagonal meshes in a purse seine were subsequently carried out. The centre part of an ordinary herring purse seine with net of rhombic meshes was replaced by a net of hexagonal meshes of the same dimension in a length of 47 m along the floatline and in full depth (90 m). The net of hexagonal meshes was hung to the floatline with a hang-in ratio of 25% while the other part of the net had a hang-in ratio of 45%. The net of hexagonal meshes was mounted and tested with the length direction of the mesh both vertically and horizontally.

The operation depth of the net was measured by a bathykymograph. It was found that the part of the net with hexagonal meshes reached greater depth than the other parts of the seine and the greatest depth was obtained when the hexagonal meshes were mounted in horizontal direction.

This year a full scaled purse seine with net of hexagonal meshes has been built and tested. The net was built as a medium sized saithe net with a mesh opening of 60 mm (each bar 20 mm). The length of the net was 465 m along the floatline and 32 m longer along the leadline. The maximum stretched net depth was 83 m. The net of hexagonal meshes was hung to the floatline with a hang-in ratio of 25% and with the length direction of the hexagonal meshes mounted horizontally. The groundrope was a leadcable of 1.38 kg/m.

Fishing tests were carried out during the saithe fisheries at the north and west coasts of Norway in June/July with M/S "Bådsvik" - a 70 ft. commercial purse seiner.

The sinking velocity and operation depth were measured by means of a bathygraph attached to the leadline at the middle purse ring. The sinking velocity was found to be about 11 m/min. which is rather fast for such a lightly weighted net (1.70 kg/m including leadcable and rings).

The maximum operation depth measured was about 80 m. In this case the net was allowed to sink in more than 10 minutes before the pursing started. This means that net of hexagonal meshes could reach nearly the same depth as the vertical stretched depth, though the hang-in ratio was not more than 25%. When pursing was started immediately after shooting the operation depth was measured to about 70 m.

The net behaved very well during operation. Especially in strong current it seems to have advantage in relation to nets of rombic meshes because of low water resistance.

During the first weeks of the cruise, fish trials were carried out on the Finnmark coast, but the concentration of saithe was low and the schools stood rather deep, from 40 to 70 m. Four sets were made on these schools, but the school descended beneath the net during pursing, and no catch was obtained. Only seiners with nets deeper than 130 m caught saithe in this area.

Later on the fish trials were carried out on the west coast of Norway, south of Stad. In this area rather good concentrations of small saithe, 30-40 cm in length, were found. Nine sets were made here on schools standing from the surface to 45 m. Six of these sets were successful and catches from 1 to 12 tons were obtained with a total catch of about 40 tons during a period of three days.

REFERENCES

- ANDREEV, N.N. & LJUBIMOV, V.G. 1975. Geometrical properties of net of hexagonal meshes. Rybnoe Khoziaistvo 1975 (9).